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great Intercourse with *England*, might introduce some Greek Letters to exprefs those Sounds which they had not in their own Language ; from hence they were carried into *France*, with the rest of the *Saxon* Alphabet, and so into *Italy*; which *Mabillon* also in effect acknowledges when he says, *Hanc tamen Scripturæ formam non Franci à Romanis, qui Langobardicis passim Elementis tunc utebantur, sed à Francis Romani accepisse videntur*. But it would take up too much time here to discourse of the Original of the *Saxon* Character, and whence those Agreements between it and the pure *Merovingian* and *Lombard* Characters might at first arise ; and perhaps the thing it self does not deserve any farther enquiry.

An Estimate of the Quantity of Vapour raised out of the Sea by the warmth of the Sun ; derived from an Experiment shown before the Royal Society, at one of their late Meetings : by E. Halley.

THAT the quantity of aqueous Vapours contained in the *Medium* of the Air, is very considerable, seems most evident from the great Rains and Snows which are sometimes observed to fall, to that degree, that the Water thus discharged out of the Interstices of the Particles of Air, is in weight a very sensible part of the incumbent Atmosphere : but in what proportion these Vapours rise, which are the Sources not only of Rains, but also of Springs or Fountains (as I design to prove) has not, that I know of, been any where well examined, tho it seem to be one of the most necessary Ingredients of a real and Philosophical Meteorology ; and as such, to deserve the consideration of this Honourable Society. I thought it might not be unacceptable, to attempt, by Experiment to determine the quantity of the Evaporations of Water, as far as they arise from Heat ; which, upon Tryal, succeeded as follows.

We

We took a Pan of Water, about 4 inches deep, and 7 inches $\frac{2}{10}$ diameter, in which we placed a Thermometer, and by means of a Pan of Coals, we brought the Water to the same degree of heat which is observed to be that of the Air in our hottest Summers; the Thermometer nicely shewing it. This done, we affixed the Pan of Water, with the Thermometer in it, to one end of the Beam of the Scales, and exactly counterpoised it with weights in the other Scale; and by the application or removal of the Pan of Coals, we found it very easie to maintain the Water in the same degree of Heat precisely. Doing thus, we found the weight of the Water sensibly to decrease; and at the end of two hours we observed that there wanted half an ounce *Troy*, all but 7 grains, or 233 grains of Water, which in that time had gone off in Vapour; tho one could hardly perceive it smoak, and the Water were not sensibly warm. This Quantity in so short a time seemed very considerable, being little less than 6 ounces in 24 hours from so small a Surface as a Circle of 8 Inches diameter. To reduce this Experiment to an exact Calculus and determine the thickness of the skin of Water that had so evaporated, I assume the Experiment alledged by Dr. *Edward Bernard* to have been made in the *Oxford Society*, viz. That the Cube foot, *English*, of Water weighs exactly 76 pounds *Troy*; this divided by 1728, the number of inches in a foot will give $25\frac{1}{3}$ grains, or $\frac{1}{2}$ ounce $13\frac{1}{3}$ grains for the weight of a Cube inch of Water; wherefore the weight of 233 grains is $\frac{233}{253}$, or 35 parts of 38 of a Cube inch of Water. Now the Area of the Circle, whose Diameter is $7\frac{2}{10}$ inches, is 49 square inches; by which dividing the quantity of Water evaporated, viz. $\frac{34}{38}$ of an inch, the Quote $\frac{34}{1332}$ or $\frac{1}{39}$, shews that the thickness of the Water evaporated, was the 53^d part of an Inch: but we will suppose it only the sixtieth part, for the facility of Calculation. If therefore Water as warm as the Air in Summer, exhales the thickness of a 60 part of an inch in two hours from its whole Surface, in twelve hours it will exhale the $\frac{1}{10}$ of an inch; which quantity, will be found abundantly sufficient to serve for all the Rains, Springs

Springs and Dews, and account for the *Caspian* Seas being always at a stand, neither wasting nor overflowing; as likewise for the Current said to set always in, at the Streights of *Gibraltar*, tho those Mediterranean Seas receive so many and so considerable Rivers.

To estimate the quantity of Water arising in Vapour out of the Sea, I think I ought to consider it only for the time the Sun is up, for that the Dews return in the Night, as much if not more, Vapours than are then emitted; and in Summer the Days being longer than twelve hours, this excess is ballanced by the weaker Action of the Sun, especially when rising, before the Water be warmed: so that if I allow $\frac{1}{10}$ of an inch of the Surface of the Sea to be raised *per diem* in Vapours, it may not be an improbable Conjecture.

Upon this Supposition, every 10 square Inches of the Surface of the Water yields in Vapour *per diem* a Cube inch of Water; and each square foot half a Wine-pint; every space of 4 foot square, a Gallon; a mile square, 6914 Tons; a square Degree, supposed of 69 *English* miles, will evaporate 33 Millions of Tons: and if the Mediterranean be estimated at 40 Degrees long and 4 broad, Allowances being made for the Places where it is broader by those where it is narrower, (and I am sure I guess at the least,) there will be 160 square Degrees of Sea; and consequently, the whole Mediterranean must lose in Vapour, in a Summers-day, at least 5280 Millions of Tons. And this quantity of Vapour, tho very great, is as little as can be concluded from the Experiment produced: And yet there remains another Cause, which cannot be reduced to Rule, I mean the Winds, whereby the Surface of the Water is lick'd up sometimes faster than it exhales by the heat of the Sun; as is well known to those that have considered those drying Winds which blow sometimes.

To estimate the quantity of Water the Mediterranean Sea receives from the Rivers that fall into it, is a very hard task, unless one had the opportunity to measure their Channels and Velocity; and therefore we can only do it by allowing more than

than enough; that is, by assuming these Rivers greater than in all probability they be, and then comparing the quantity of Water voided by the *Thames*, with that of those Rivers whose Water we desire to compute.

The Mediterranean receives these considerable Rivers; the *Iberus*, the *Rhone*, the *Tiber*, the *Po*, the *Danube*, the *Neister*, the *Boryshenes*, the *Tanais*, and the *Nile*, all the rest being of no great note, and their quantity of Water inconsiderable. These nine Rivers, we will suppose each of them to bring down ten times as much Water as the River *Thames*; not that any of them is so great in reality, but to comprehend with them all the small Rivulets that fall into the Sea, which otherwise I know not how to allow for.

To calculate the Water of the *Thames*, I assume that at *Kingston* Bridge, where the Flood never reaches, and the Water always runs down, the breadth of the Channel is 100 Yards, and its depth 3, it being reduced to an equality; (in both which Suppositions I am sure I take with the most.) Hence the Profil of the Water in this Place is 300 square Yards: this multiplied by 48 miles, (which I allow the Water to run in 24 hours, at 2 miles an hour) or 84480 Yards, gives 25344000 Cubick Yards of Water to be evacuated every day; that is, 20300000 Tons *per diem*; and I doubt not but in the excess of my measures of the Channel of the River, I have made more than sufficient allowance for the Waters of the *Brent*, the *Wandel*, the *Lea*, and *Darwent*, which are all worth notice, that fall into the *Thames* below *Kingston*.

Now if each of the aforesaid 9 Rivers yield 10 times as much Water as the *Thames* doth, 'twill follow that each of them yields but 203 millions of Tons *per diem*, and the whole 9 but 1827 millions of Tons in a day; which is but little more than $\frac{1}{3}$ of what is proved to be raised in Vapour out of the Mediterranean in 12 hours time. Now what becomes of this Vapour when raised, and how it comes to pass that the Current always sets in at the mouth of the Straights of *Gibraltar*, is intended, with leave, for a farther Entertainment

tainment of this Honourable Company: in the mean time, it is needful to advertise the Reader, that in making the Experiment herein mentioned, the Water used, had been salted to the same degree as is the common Sea-water, by the Solution of about a 40th part of Salt.

Observationes nonnullæ Eclipsæ Solaris,
Maii 1. St. vet. diversis in locis habitæ, ac cum Re-
giâ Societate Communicatæ.

HÆC Eclipsis, etiamsi contemnendæ quantitatis fuerit, ac nudis oculis non omnino percipi potuerit, tamen ad accuratam determinationem Parallaxis & Latitudinis Lunæ maxime idonea videtur. Quapropter quas hæcenus obtinere potuimus observationes cape Lector Benevole.

Londini seorsim observantibus Hookio & Halleio; Initii momentum, cælo licet purissimo, ob obliquam incidentiam Lunæ, debite definire non licuit. Sed hora 1^h. 16'. jam cæpta erat Eclipsis satis notabiliter: circa 1^h. 40'. prope medium Eclipsis, Chorda partis Eclipsatæ, sive inter cornua, inventa est 9'. 30". cui respondet arcus 36 gr. in diametro vero non nisi 1'. 30". Finis consensu utriusque observatoris contigit accurate hora 2^h. 3'. 00.

Grenovici in Observatorio Regio Flamsteedius eadem de causa Initium non vidit, finem vero determinavit 2^h. 4'. 15". Medio Eclipsis sive maximâ obscuratione, Chorda partis Eclipsatæ erat 9'. 54".

Apud Totteridge prope Londinum versus Corum, finem videt Dominus Haines, Reg. Soc. Soc. ad 2^h. 2'. Quantitatem vero Maximam dimidii Digiti, ab Austro.

In Insula Barbada, ad Oppidum Bridge-Town, sub Lat. 12 gr. 58'. Finem habuit Dominus Frank 1'. 30". temporis ante quam Solis Altitudo fuit 31 gr. 47'. ad ortum, hoc est hora 7^h. 56'. 45". A.M. Quantitatem Maximam estimatione definivit duorum digitorum ab Austro.

Norim.